

will have the advantage of the knowledge and experience of the largest, while the latter will benefit by the combined knowledge, experience, and advice of all the rest of the trade. In many cases new sources of raw materials will have to be found and new methods of finance devised. The problem of the best way to secure adequate representation of British industry in foreign markets will have to be solved, and the best way of utilising the new part-time continuation schools considered. In all these questions labour will be consulted, and the employed will take an equal part with employers. The watchword of reorganisation is "Unity of industrial interest."

The general principles voiced by the Whitley report have received recognition on all hands, but some organising force is necessary to give them practical effect. This is the purpose of the Industrial Reconstruction Council. It is desirable that some obviously disinterested body should take the first step towards establishing a council in a particular trade. The I.R.C. is prepared to send representatives to a meeting, large or small, of any association of employers or employed in order fully to explain the mode of formation and functions of an industrial council. The Ministry of Reconstruction can be approached at a later stage when the scheme has been drafted by the industry. An industrial council consisting of equal numbers of employers and employed has already been formed for the pottery industry. This council will establish committees for dealing with special branches, and may co-opt outside experts upon them. Among its special duties will be that of making the manufacture of pottery as hygienic as possible.

The aims of the Labour Party, of course, go far beyond the organisation of particular trades. The chief appears to be to form the dominant party in the House of Commons. Unfortunately, the promoters look forward to a perpetuation of the system of party government; but if all the workers by brain, as well as by hand, combine into one party for the government of the State on democratic lines, party government will practically cease, because one party is equivalent to no party. Scientific men will certainly not be disposed to support any system of party politics, and they would be more likely to take part in the new programme if it were made clear that the Labour Party signified a federation or organisation in which brain and hand were united for common welfare rather than the narrow interests of one particular section of the country's life. The question has been asked, "Will the brain-worker secure adequate representation in the councils of the Labour Party?" Provided that the community of interest between hand and brain is fully recognised, the hand may be trusted to make use of the brain, and the brain will not suffer from failure to take part in the work of the world. May we not hope that government by dialectics will belong to History?

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THE FERTILISER SITUATION IN THE UNITED STATES.

FOR some time after the war had opened, and in particular when the unrestricted submarine campaign began to assume important dimensions, the United States found that its supplies of the three most important fertilisers were seriously compromised: instead of being, as many had imagined, wholly a producing country, it was found to be dependent on other countries for these vital raw materials. Chile supplied nitrate of soda, the most potent nitrogenous fertiliser; Spain sent the pyrites necessary for the manufacture of sulphuric acid, which in turn forms the basis of the superphosphate and sulphate of ammonia industries; while Germany sent potassium salts, without which many mixed fertilisers are incomplete. With characteristic promptitude the situation was carefully reviewed, and a statement has been issued by the Smithsonian Institution¹ showing in as much detail as is judicious how the United States now stands in the matter.

The situation in regard to phosphatic fertilisers is rather peculiar. The United States claims to possess within its borders the largest known deposits of rock phosphate in the world. The annual output is three million tons. Most of this (about 75 per cent.) comes from Florida, where there are three types of deposits: rock phosphate, pebble phosphate, and soft phosphate, all superficial horizontal beds of solid rock or loose pebbles representing a residue of phosphate left after the associated rock had been dissolved and washed away. These deposits can be worked by large open pits, and being situated near the coast, the material can be readily transported to other parts of the country or to Europe.

Other deposits occur in South Carolina, Tennessee, Kentucky, and Arkansas, but by reason of their smaller output and less favourable situation for transport they are less important than those in Florida.

In course of time these supplies must become exhausted, and rather gloomy pictures have been drawn of the days when lack of phosphates would jeopardise, and finally terminate, man's existence on this globe. Great interest, therefore, attaches to the discovery made in 1906, and since confirmed, that a belt of country stretching from Salt Lake City, in Utah, to Helena, in Montana, contains a number of beds of phosphatic rock. The amount is said to be larger than in any other known deposits.

So far, therefore, as the rock phosphate is concerned, the United States is in a very strong position. But, unfortunately, rock phosphate alone is not wholly suitable as a fertiliser. In some instances, especially where the soil is rather acid, it acts very well, and Dr. Cyril Hopkins and other well-known agricultural experimenters have studied these cases in some detail, thus accumulating very valuable information.

In many other cases, however, better results

¹ "The Mineral Industries of the United States." By J. E. Pogue Smithsonian Institution Bulletin No. 102, 1917.

are obtained when the phosphates are treated with sulphuric acid. But this requires pyrites from Spain, which is no longer easy to get, and in any case the resulting sulphuric acid is also needed for making explosives. Other sources of sulphur are, therefore, being exploited, in particular the pyrites and the pyrrhotic deposits of the Eastern States and the sulphur deposits of Louisiana and Texas.

The nitrogen problem is extremely urgent. Chilean nitrates are largely used for making explosives, and are practically unobtainable for agricultural purposes. Prior to the war the largest source of fertiliser nitrogen in the United States had been the various organic products, such as tankage, fish scrap, and cotton-seed meal, produced in the country. With the coming of the war, however, other demands have been put upon most of these, and their prices have risen; thus cotton-seed meal is now used as animal food.

Coal is a satisfactory source of nitrogen, one ton of American coal containing on an average 20 lb. of nitrogen. The proportion actually recovered, however, is only small, corresponding in 1913 with 3 per cent. of the total quantity of coal mined, but a higher recovery is said to be obtained to-day. In 1913 about 12 per cent. of the coal (or 69,000,000 tons) was made into coke, but three-quarters of this was done in the old bee-hive oven, and only a quarter in the more modern ovens from which recovery of the nitrogen is possible. This proportion, however, is steadily increasing.

All these methods are essentially transitory; they come to an end in that indefinite time when coal and nitrate of soda are both exhausted. The permanent, never-failing supply is the atmosphere. Already calcium nitrate, cyanamide, and ammonia are produced synthetically, but of these only cyanamide is as yet made in North America, and that only on the Canadian side of Niagara. The need, however, is fully recognised, and the work is being vigorously pushed forward. The sum of twenty million dollars was appropriated in 1916 for the construction of the plant, and although the scheme is not yet in working order, we may be sure that it will materialise. The peculiar and profound importance of these synthetic processes as the central feature of the war is fully recognised, and, as the author of the Bulletin justly remarks: "It is significant that war was declared directly after the successful development of the Haber and cyanamide processes in Germany."

The dependence of the civilised world on Stassfurt for its necessary potash was accepted as a natural and fundamental fact prior to the war, and very little was done to obviate it. Potassium is extremely common; only seven other elements are more abundant, and it is calculated that there is more potash in the earth's crust than water. But, unfortunately, workable deposits are rare, and only the one at Stassfurt is actually worked to any notable extent. For some time before the war the United States Government

recognised the drawbacks of the position, and caused a systematic search to be made for potash within its own borders. A limited amount of potash can be obtained from the wood-ashes of the lumber industry in Michigan and Wisconsin. Another source is the mineral alunite, a potassium aluminium sulphate occurring in moderate-sized deposits in Utah. Another, again, is kelp produced from the giant seaweed of the Pacific coast from Lower California to Alaska. A more important source is the flue-dust obtained from Portland cement works and from blast-furnaces. Still more important from the point of view of immediate production are the alkali lakes of the West, which at present yield most of the American supply: Jesse Lake, in western Nebraska, supposed to derive its potash from the forests burnt on the adjacent plains; Searles Lake, in California, reputed to contain great quantities of potash, though there are so many other salts as well that the extraction is by no means simple; Owen's Lake, also in California, several lakes in Oregon and elsewhere. In addition, there are salt beds in Texas, Oklahoma, and other places where some of the underlying strata were formed in arid climates.

There are still other possibilities which have not yet come to anything, though they are not without promise for the future: felspar, which occurs in scattered and rather small deposits; leucite, forming a conspicuous component in a rock mass of considerable size in Wyoming; sericite, which forms extensive beds in Georgia; and greensand, found widespread in the Atlantic coastal plain, especially in New Jersey. All these are open to exploitation.

But what will be the future of these new fertiliser industries, assuming they mature? Will they disappear after the war, choked by the competition of German products, or will they be kept alive by artificial support? This is a political question scarcely less important than the chemical and engineering problems involved, and one which we may be sure will receive serious and systematic consideration.

E. J. RUSSELL.

WHAT DETERMINES STATURE? ¹

DR. C. B. DAVENPORT has collected data in regard to human stature, and analysed them by modern methods of studying heredity. Some of the data refer to 2354 children of parents whose height is recorded, but the precision of this recording was very unequal. The other data refer to the inheritance of stature in families, and these, while less numerous, are more uniformly precise.

For the class of people dealt with, it appears that nutrition is not of much importance in determining stature. It is improbable that insufficient or improper food counts for much in determining eventual height; "temporary starvation has little or no effect on the end result. So, likewise,

¹ Bulletin No. 18, "Inheritance of Stature." Pp. 313-89+33 tables and 19 figs. (Eugenics Record Office, Cold Spring Harbour, N.Y., 1917.) Price 40 cents.